MXS-EXP

Electric ARF Assembly Manual

EXTREME FLIGHT
RADIO CONTROL™
STATE-OF-THE-ART R/C AEROBATIC AIRCRAFT AND ACCESSORIES

Tips for Success:

1. Before starting assembly, take a few minutes to read the entire instruction manual to familiarize yourself with the assembly process.

2. Please take a few minutes and go over all the seams on the aircraft with a covering iron on a medium heat setting. Avoid using a heat gun on seams.

3. Use a fresh bottle of thin CA with a fine glue tip when attaching the CA hinges. This will ensure that the proper amount of CA wicks into the hinge and surrounding balsa wood and creates a proper bond between the wood and hinges. We are big fans of the Mercury line of adhesives as well as the glue tips provided by them.

4. Apply a couple drops of CA to high stress areas such as anti-rotation pins, landing gear mounts, servo trays and motor box joints and carbon support mounts.

5. All of the G10 control horns are the same with the exception of the elevator horn. Its base has been shortened to fit the depth of the elevator.

6. When applying decals, first clean the area where the decal will be applied with alcohol. Mist the area lightly with Windex before applying the decal which will allow you to properly position it, then use a rubber squeegee to push all of the liquid from under the decal. This will result in very few air pockets trapped under the decal.

7. Take the time to properly balance and trim your aircraft and set up rates and exponential values. Your flying experience will be greatly enhanced by doing this.

Please note: The assembly process for the MXS is pretty much identical to that of the Extra and Edge EXP. Many of the photos in this manual will show the Extra airframe. Only those assembly steps which differ will show the MXS (mainly the installation of the dual ball link pushrod assemblies and the installation of the elevator and horizontal stabilizer).

Items needed for completion

-masking tape

-Thin and medium CA. We highly recommend Mercury M5T thin and M100XF medium formulas as well as the Mercury glue tips.

-30 minute epoxy. The new Mercury adhesives Epoxies have worked very well for us.

-Blue Loctite.

-Silicon based glue (Zap-A-Dap-A-Goo, etc.)

-Electric drill with an assortment of small drill bits.

-Small flat head and Phillips head screw drivers.

-Standard and needle nose pliers.

-Metric balldriver or allen key set.

-3 sub micro metal geared servos and 1 micro metal geared servo. All flight testing was performed with Hitec HS-65MG and HS-5065MG digital servos on the ailerons and rudder and a single Hitec HS-85MG on the elevator. We strongly recommend the use of these high quality servos.

-Torque 2814T/820 Brushless Outrunner motor. This is the motor that this aircraft was designed around and will deliver the best performance for the MXS.

-Airboss Elite 45 Amp ESC.

-4S 2350-3000 mah LiPo battery. We've had great success with the Thunder Power line of batteries as well as the Zippy Rhino and Flightmax bargain LiPos available from www.hobbycity.com in both 2350 mah and 2650 mah sizes.

-APC 12x6 E prop (NOT the slow fly version!).

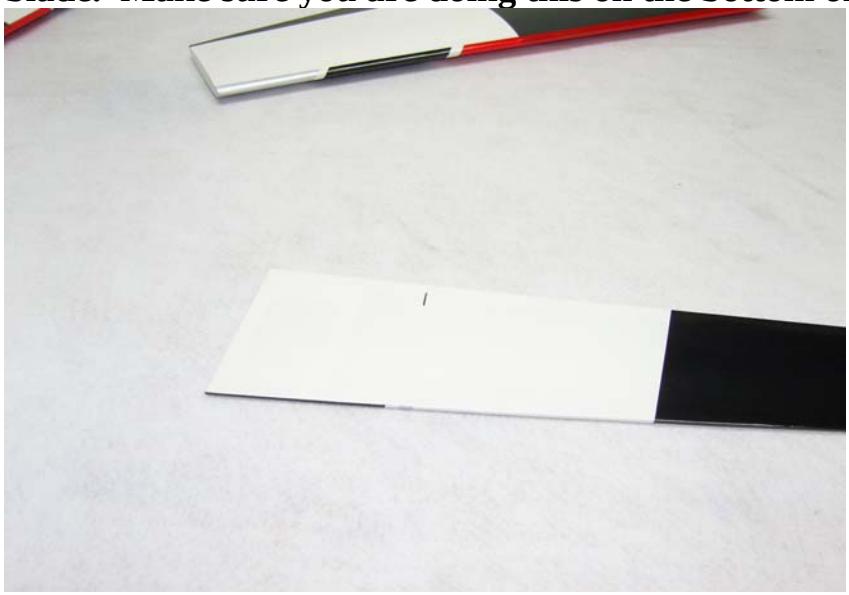
-52mm Extreme Flight spinner.

-2 18"-24" extensions for the 2 rear servos and 2 6"-8" extensions to go between the receiver and the aileron servo leads. We recommend the 28 or 32 AWG extensions to save weight.

-Adhesive backed Velcro and Velcro strap for battery retention.

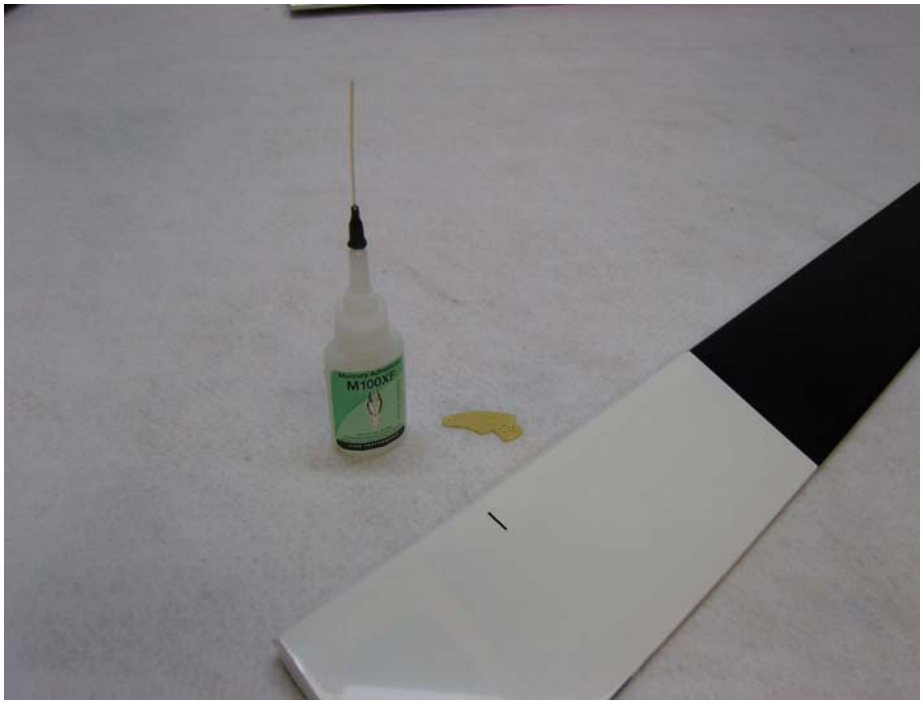
Let's begin!

1. Locate the 2 wing panels with ailerons as well as the 2 G10 aileron control horns. Remove the ailerons from the wing and remove the covering over the slot for the aileron horn on the bottom of the aileron with a sharp hobby blade. Make sure you are doing this on the bottom of the aileron!



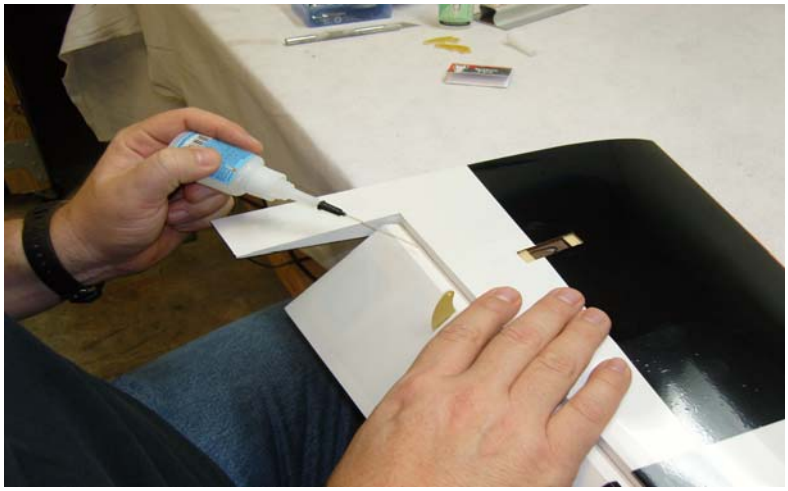
2. Scuff the portion of the control horn that will be glued into the aileron with sandpaper.

3. Use a glue tip on your bottle of medium CA and apply glue to the slot as well as to both sides of the control horn. Insert the control horn into the slot and make sure it seats properly against the surface of the aileron.

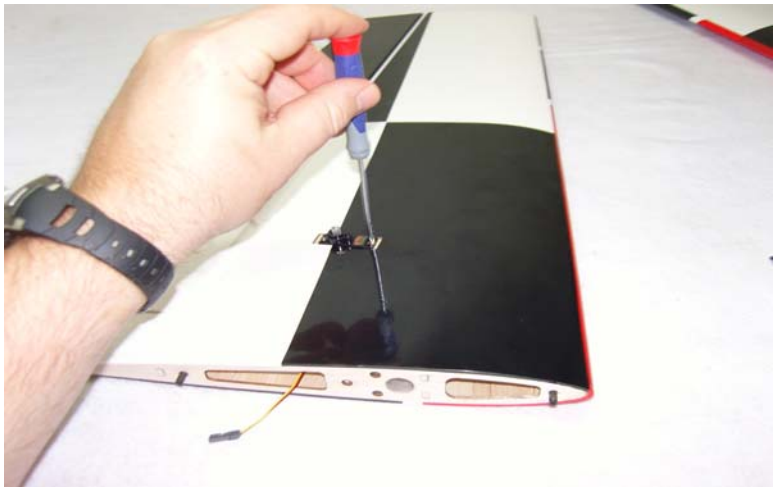


4. Remove the covering from the aileron servo location and make sure the hinges are centered in their slots.

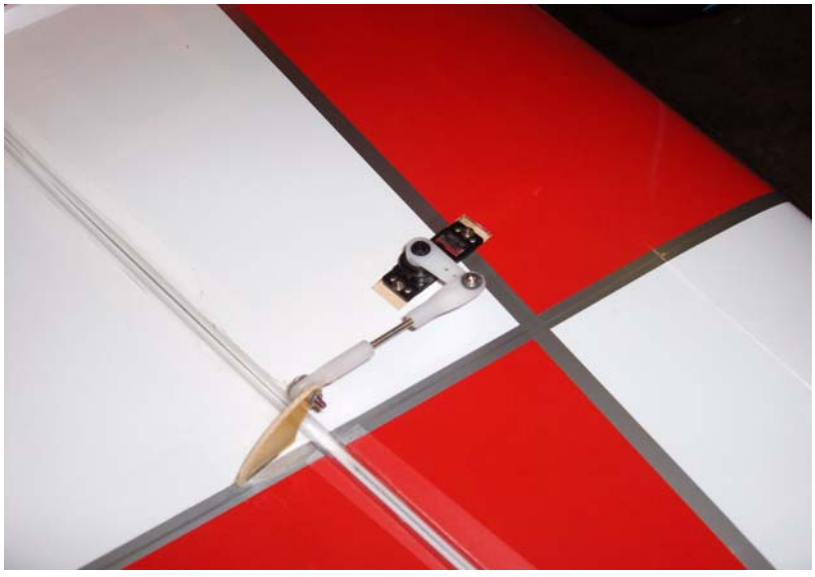
5. Slide the aileron into position on the hinges and secure with several drops of fresh thin CA. This process is much easier and more effective if a fine glue tip is used. Make sure to deflect the surface as pictured while applying the CA.



6. Use the screws provided by the servo manufacturer to secure the aileron servo in the designated location. 1 screw installed in the center hole at each end of the servo is adequate to secure the servo. Make sure the output shaft is positioned toward the trailing edge of the wing.



7. Locate the 2 threaded pushrods that are the same length and 4 micro ball links along with 4 2mm screws, nuts and washers. Thread the ball links onto each end of the pushrods and secure to the servo arm and control horn with the 2 mm hardware as shown in the picture. Use the longest arm provided with your servo.

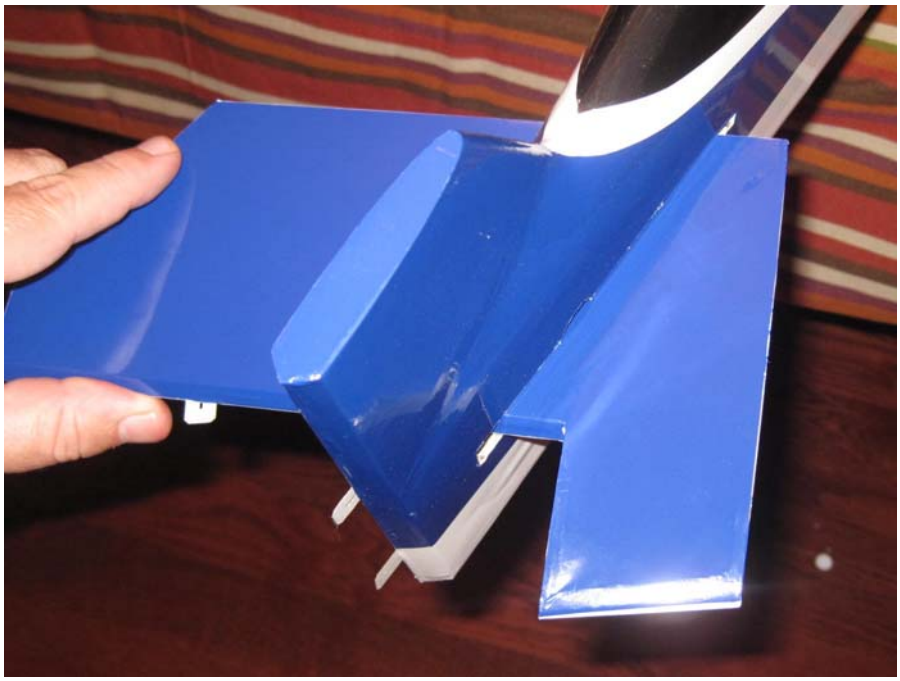


Repeat this process for the other wing half.

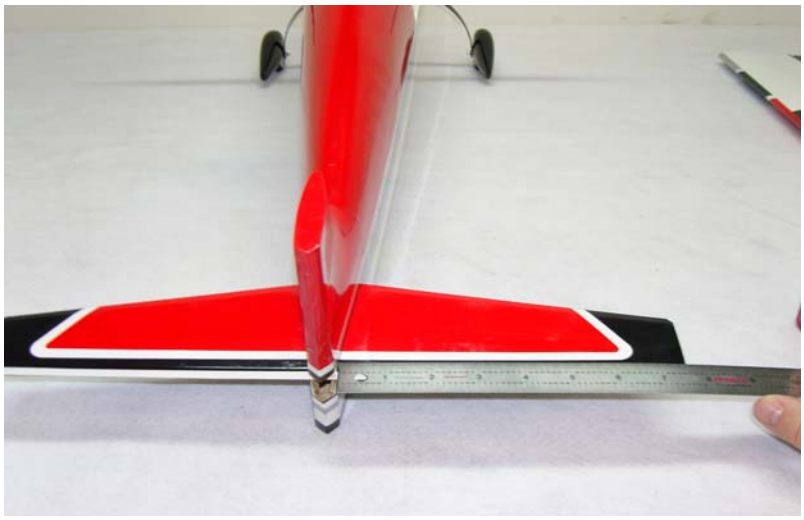
8. Locate the fuselage, one piece carbon fiber landing gear (the gear pictured in the photo is the curved Extra landing gear. The gear legs on the MXS are straight), 2 silver 3mm machine screws and 2 washers. Secure the landing gear to the fuselage by inserting a 3mm screw into a washer, through the carbon fiber gear and into the pre-installed blind nut in the fuselage. Make sure to use a drop of blue Loctite on each screw to prevent them from backing out.

9. Locate the 2 axles, 2 locking nuts, 2 wheels, 2 wheel collars and 2 wheel pants from the hardware package. Place the wheel onto the axle and secure with a wheel collar. Place the threaded portion of the axle through the hole in the carbon gear and screw the lock nut onto the axle, but do not tighten completely. There is a slot pre-cut in the wheel pant to allow it to fit over the axle. Before installing the wheel pant place a drop of silicon based glue onto the wheel pant just above the pre-cut slot. This will prevent the wheel pant from rotating, but allow it to move in the case of a mishap which may help to prevent damage. Slide the wheel pant into position over the axle and tighten the nut on the axle, taking care to make sure the wheel pant is positioned properly. Repeat this process for the remaining wheel pant. Again this is probably better explained in the following series of pictures.

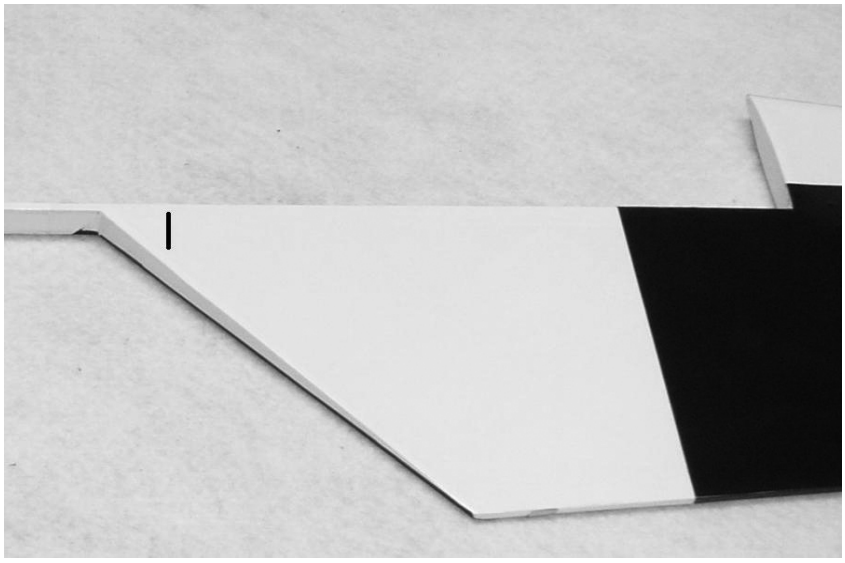
10. Locate the horizontal stabilizer/elevator assembly and slide the elevator off of the hinges. <u>Please pay careful attention here!!!</u> <u>You must insert the one piece elevator into the fuselage before installing the horizontal stabilizer!</u> The elevator must be inserted into the fuselage upside down with the counter balances facing the rear of the aircraft as shown in the following photo. Once inserted into the fuselage the elevator can be rotated 180 degrees and placed in the proper location.



11. Insert the stabilizer into its slot and the carbon fiber wing tube into the fiberglass sleeve. Use a ruler to insure that the stabilizer is centered in its slot and compare the stabilizer to the wing tube to make sure it is properly aligned. Sand or shim the slot if necessary to ensure proper alignment. Secure the stabilizer with CA.



11. Remove the covering over the <u>right</u> slot on the <u>bottom</u> of the elevator where the elevator control horn will be installed. <u>The elevator horn is the one with the shortest shank</u> that is glued into the surface. Scuff the portion of the control horn that will insert into the elevator with sandpaper. Secure the control horn with medium CA.

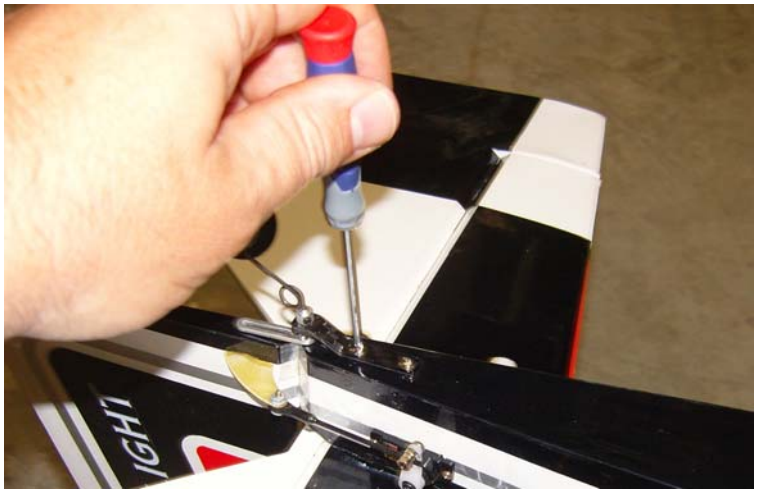


12. Slide the elevator onto the hinges in the stabilizer and secure with thin CA. Again a fresh bottle of CA and a fine glue tip work best here.

13. Remove the covering over the slot in the lower right side of the rudder where the rudder control horn will be installed. Scuff the portion of the control horn that will glue into the surface and secure the rudder control horn with medium CA just as you did with the elevator control horn.

14. Using the same process as with the ailerons and elevator, slide the rudder onto the hinges and secure to the vertical stabilizer with thin CA.

15. Locate the carbon fiber tailwheel assembly in the hardware package. Secure the tailwheel bracket to the bottom rear of the fuselage with the provided wood screws. Make sure the pivot point of the assembly is over the hinge line of the rudder for best results.



16. Secure the tiller using the provided screw, but do not over tighten as the tiller should be able to move on the screw as the rudder is deflected.

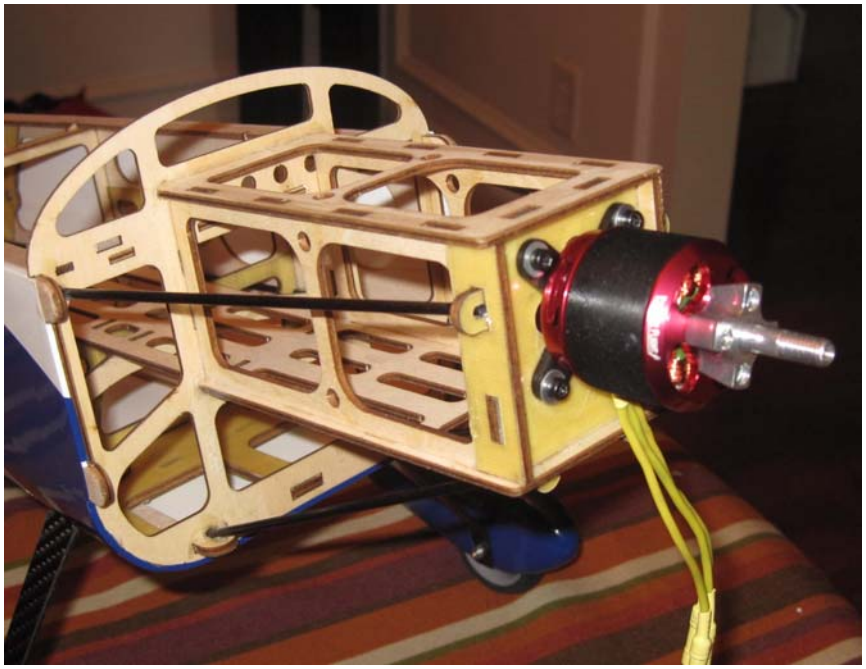
17. Place the tailwheel wire in the proper position, aligned with the rudder and lock into place with the 2 set screws.

18. <u>Before installing the elevator and rudder servos soak the plywood servo mounting plates with thin CA</u>. Use the hardware provided with the servos to install the rudder and elevator servos in their respective location in the rear of the aircraft. From the pilot's perspective the rudder servo mounts on the right side of the fuselage and the elevator servo mounts on the left side. The elevator servo should have the output shaft toward the <u>front</u> of the aircraft while the rudder servo output shaft should be toward the <u>rear</u> of the aircraft.

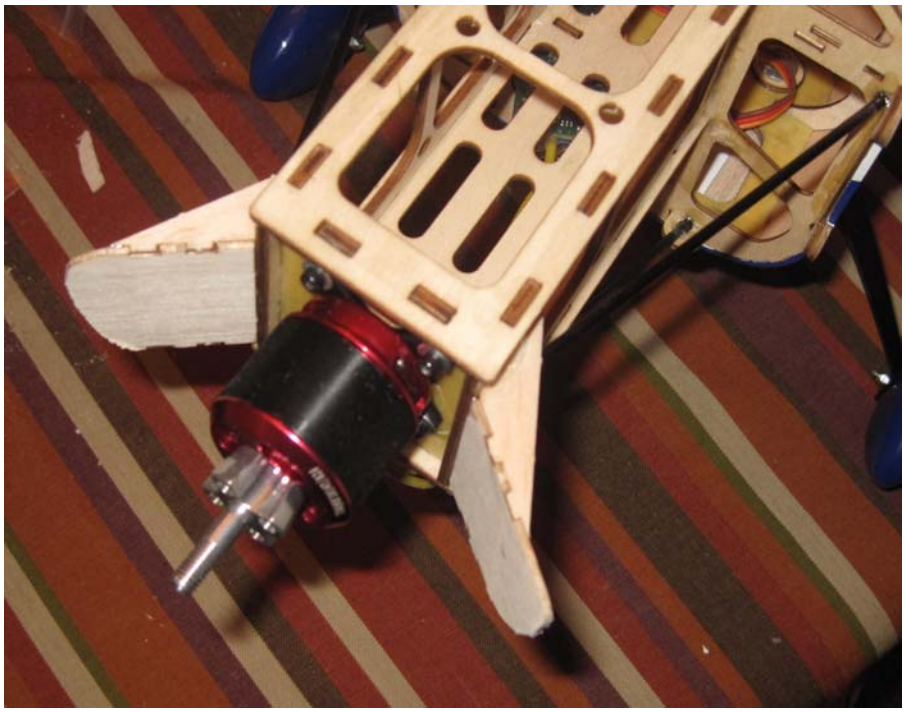
<u>We highly recommend the use of the Hitec HS-85MG for the elevator of the MXS. The HS-65MG wroks great for the ailerons and rudder.</u>

19. The rudder and elevator servo linkage assembles and is installed just like the aileron linkage. For maximum travel we have included a G10 control horn which is bolted to the stock control horn provided with the servo. We have found it easiest to tack glue the G10 arm to the nylon arm and then using the holes in the nylon arm as a guide, drill through the composite arm. Secure the arm with the provided screws and bolts. The remaining portion of the linkage installation is the same as the other control surfaces.

20. Mount the motor using the supplied 3mm black socket head cap bolts which are threaded into the blind nuts which are pre-installed in the motor mount plate. Be sure to put a drop of blue Loctite onto each bolt to prevent them from backing out. <u>Be sure to add some CA to all motor box joints as well as to the attachment points of the carbon fiber motor box supports</u>.



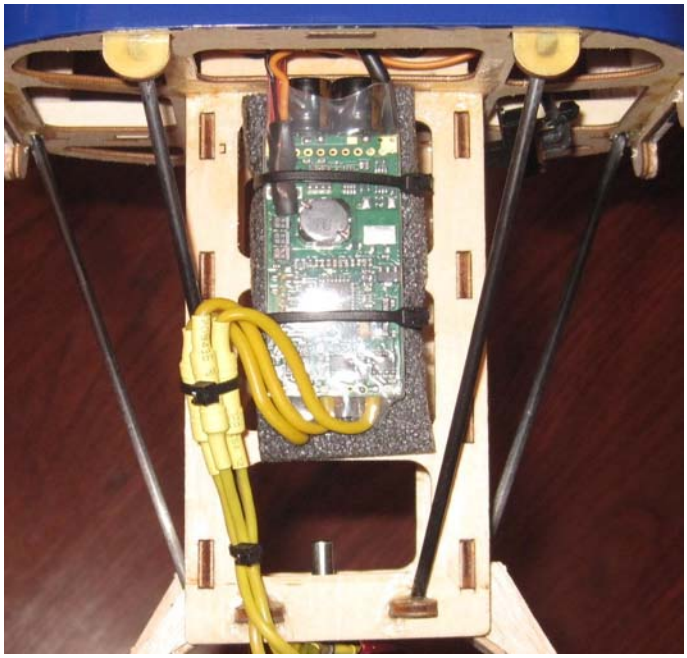
21. Also notice the laser cut balsa baffles. A set of these is included which can be attached to the motor box to improve cooling by directing air over the motor. You may find it necessary to lightly sand the top front of edge of the baffle to allow for proper cowl installation.



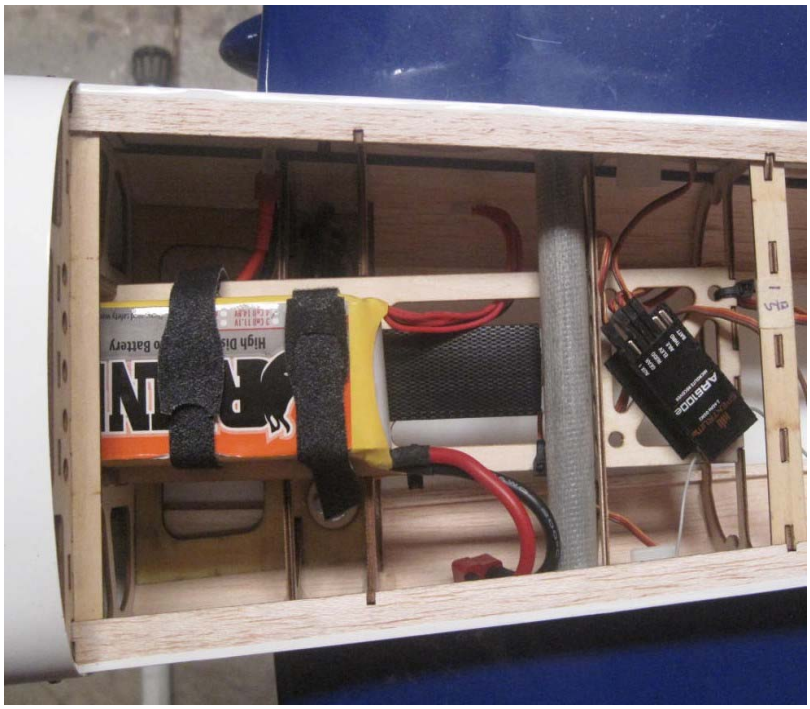
22. For quick, easy and accurate mounting of the cowl we recommend the following method. Tear 4 short pieces of masking tape from a roll. Place each piece of tape on the side of the fuselage so that each piece corresponds with one of the 4 cowl mounting tabs. Use a fine tipped marker to mark the location of the center of each mounting tab. Roll the tape back and slide the cowl into position. Install an Extreme Flight 52mm spinner onto the motor shaft for reference and once satisfied with the cowl position roll the tape back into place and secure the cowl. Use a 1/16" drill bit to drill a hole at the location of the dot on each piece of tape. Remove the tape and secure the cowl with 4 of the included small wood screws that have large heads. Very simple!

23. There is a laser cut opening in the bottom of the fuselage under the rear of the canopy. Use a sharp hobby knife to remove the covering from this location to allow cooling air to exit the fuselage.

24. Use nylon cable ties or Velcro to secure the ESC to the <u>bottom</u> of the motor box. There is an opening in the cowl just in front of this location to allow cooling air to enter and be directed over the ESC. Use a piece of open cell foam to cushion the ESC.



25. Place a strip of Velcro onto the battery tray and onto your battery and use a Velcro strap around the battery and tray to prevent the battery from being ejected during high G maneuvers. Mount your receiver on the portion of the battery tray that extends behind the wing tube with Velcro.



26. If using the included Side Force Generators or fiberglass racing wing tips now is the time to mount them. Each SFG or fiberglass tip mounts using 2 3mm bolts and 2 clear plastic washers (SFGs) or 2 small metal washers (fiberglass tips). There are 2 holes in each SFG or fiberglass tip which correspond with 2 laser cut holes in the tip of each wing. Insert the bolts into the washers and through the laser cut holes in the SFG or the pre-cut holes in the fiberglass tip. Mount the SFG or fiberglass tip onto the wing tip by screwing the bolts into the pre-installed blind nuts in the tip of the wing.

EXTREME FLIGHT RADIO CONTROL
AEROBATIC TEAM
EDGE 540T

Set-up and flying tips

The CG for the MXS should be determined with the aircraft positioned upside down. The CG range starts at 3.50 inches back from the leading edge of the wing and extends back to 4.00 inches, measured at the wing root. There is plenty of room on the battery tray to move your battery to achieve this CG location. This is a safe place to start and depending on your flying style you can adjust the position of the battery to alter the CG to accommodate your flying style. For this type of aircraft where I am going to predominantly fly aggressive 3D I typically set the airplane up with a neutral CG, meaning that when the aircraft is flown inverted straight and level it requires no down elevator to maintain altitude. If your flying style leans more toward precision aerobatics then I recommend setting your CG using the 45 degree line test. Fly the aircraft from left to right or right to left, whichever direction you are

more comfortable with at 3/4 to full throttle. Pull the aircraft to a 45 degree up line and establish this line and immediately roll the aircraft inverted. Establish this line and let go of the elevator stick. Ideally the aircraft will continue to track on that 45 degree line for several hundred feet before slowly starting to level off. Adjust the position of your battery to achieve this flight condition. Once satisfied with the location of your CG scribe a mark on the battery tray so that you can position the battery in the same location each flight and achieve the same feel and flight characteristics each flight.

I also highly recommend taking the time to properly set up your rates and exponential settings. Setting up low rates for precision maneuvers and high rates for aggressive aerobatics and 3D flight will allow you to experience the best attributes of the MXS-EXP or any aircraft for that matter.

The included elevator servo arm will allow for close to 80 degrees of throw! While this is great for really aggressive tumbling maneuvers, positive and negative waterfalls and straight down dropping elevators, it can wreak havoc on stable harriers, especially if you are just learning the maneuver. If your radio will allow I suggest setting up 3 elevator rates or a flight condition that will allow you a rate for precision flying, another for harriers and the majority of 3D maneuvers and a final rate with as much travel as you can get for the crazy tumbles and flips.

Here are some suggested rates to get started with. These are the rates and exponential values I feel comfortable with. They may feel awkward to you and if so please adjust to your taste.

Elevator: Low rate: 8-10 degrees; 15-20% Exponential

3D rate: 45-50 degrees; 60-65% Exponential

Insane tumble rate: As much as possible! 65-70% Exponential

Rudder: Low rate-20 degrees; 45-50% Exponential

3D rate- As much as possible; 80-90% Exponential

Aileron: Low rate-15-20%; 40-45% Exponential

3D rate- As much as possible; 70-75% Exponential

Again, these are my preferences, adjust to suit your flying style and preferred feel.

Again, thanks so much for your business and I sincerely hope you enjoy flying your MXS-EXP as much as I do mine!

See ya at the flying field!

Chris Hinson

Extreme Flight RC